

Measuring emergency medicine physicians' knowledge levels about their legal responsibilities in interventional procedures: a cross-sectional study

 Ayşe Sümeyye Arı,  Habibe Selmin Özensoy,  Fatih Ahmet Kahraman,
 Hakan Oğuztürk

Department of Emergency Medicine, Ankara Bilkent City Hospital, Ankara, Türkiye

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Corresponding Author: Hakan Oğuztürk, oguzturk@hotmail.com

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ABSTRACT

Aims: As the number of emergency department (ED) patients increases, medical-legal lawsuits also increase. Doctors must have medicolegal knowledge. Interventional procedures are frequently performed in EDs. Our study aims to evaluate emergency physicians' knowledge, attitudes, and behaviors regarding their medical-legal responsibilities regarding frequently performed interventional procedures.

Methods: This is a prospective questionnaire study in a single center. The questionnaires were answered via Google® Form. Participants were asked questions about their demographic characteristics and education levels. The study was applied to physicians working in the ED from October 10 to 20, 2023.

Results: A questionnaire was sent to 155 physicians. One hundred forty-three responded to the questionnaire. Most participants (88%) were found to have received training on interventional procedures performed in the ED, but their level of knowledge about their legal responsibilities during interventional procedures was lower (18.2%). It was observed that specialist physicians and faculty members had better awareness of interventional procedures in the Postgraduate Emergency Medicine (PEM) training program than assistant physicians ($p<0.001$). As age and professional experience increased, the training received and awareness levels increased ($p<0.001$).

Conclusion: Specialists and faculty members have higher legal knowledge, while assistant physicians face difficulties in fulfilling their legal responsibilities. Findings highlight the need for early legal education in emergency medicine for their legal responsibilities in invasive procedures.

Keywords: Interventional procedures, legal responsibility, emergency department

INTRODUCTION

Every patient who comes to the emergency department (ED) tends to perceive their situation as urgent and assume that it is a top priority. While emergency service applications in Turkey were approximately 92 million in 2016, they were approximately 130 million in 2021.¹ As EDs fill daily, it can be difficult for doctors to gauge the urgency of each case accurately. Although ED physicians are responsible for diagnosing and treating patients quickly, without error and harm, they must also comply with their medical and legal obligations and ensure compliance with legal regulations.² Malpractice has long been a topic of interest to ED physicians and the legal community. According to a data analysis containing records

of 40,916 closed malpractice cases covering all US states from 1991 to 2005, Emergency medicine was the 15th most likely to be involved in litigation among 25 medical specialties.³ Studies have associated emergency medicine with a moderate risk of malpractice, with litigation frequency approximately equal to the average for all specialties and fewer than average physician claims resulting in compensation.^{3,4} Malpractice cases are quite stressful and involve long stages.⁵

Physicians working in ED have legal responsibility in their practices, especially when making urgent decisions that may affect patients' lives. All healthcare professionals are expected to adhere to established standards of care, clinical guidelines,



and protocols.⁶ They must also comply with current standard practices in line with legal regulations and malpractice rules. Several key principles associated with patient safety and positive treatment outcomes include obtaining informed consent from patients, effective provider-patient communication, and maintaining accurate and comprehensive medical records.^{7,8}

With the increasing number of malpractice cases in medical law, all physicians must understand their legal responsibilities and rights and act accordingly. This study aims to evaluate the knowledge, attitudes, and behaviors of physicians working in EDs regarding their medical and legal responsibilities while performing interventional procedures.

METHODS

Ethics

The study was conducted between October 1-20, 2023, among assistant physicians, specialist physicians, and faculty members working in a tertiary hospital's ED. The hospital handles approximately 2000 ED patients daily, including referrals from surrounding areas, with full surgical and interventional capabilities. Ethical approval was obtained from the Ankara Bilkent City Hospital No. 1 Clinical Researches Ethics Committee (Date: 12/09/2023, Decision No: E1-23-4013). Participants were informed about the study and assured confidentiality, and consent was collected through an online form integrated with a Google® Form system. All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Participant Selection

There were 155 physicians working in this hospital's ED. Physicians working in the ED were asked to participate in the Google survey form online, and an informed consent form was sent online. Physicians working in the ED (assistant physicians, specialists, faculty members) who agreed to participate in the study filled out the survey form. Participants were classified according to academic title, PEM education, and professional experience.

Data Collection

In the survey-based study, answers to questions other than the participants' demographic data were classified as multiple options. The authors created the questions after reviewing the literature. The language of the survey questions is Turkish.

The questionnaire items were categorized as follows:

- Information on interventional procedures
- Previous administrative and legal actions
- Understanding of complications vs. malpractice
- Views on informed consent
- Informed consent form effectiveness
- Safe storage of consent forms
- Knowledge of PEM training
- Legal responsibility awareness

Statistical Analysis

Data analysis was performed using IBM SPSS version 23.0. Continuous variables are presented as mean±standard deviation (mean±sd), median, and range, while categorical variables are shown as numbers and percentages. The Shapiro-Wilk test (Kolmogorov-Smirnov test when $n > 50$) assessed normality. The independent sample t-test was

used to compare two independent groups when normality and variance homogeneity (evaluated with the Levene test) were met; otherwise, the Mann-Whitney U test was applied. Comparisons of more than two groups were done using the Kruskal-Wallis test, followed by the Dunn test with Bonferroni correction if significant. Categorical variables were compared using Pearson's chi-square or Fisher's Exact tests as needed. A p -value < 0.05 was considered statistically significant.

RESULTS

There were 155 physicians working in this hospital's ED. One hundred forty-three of these physicians agreed to participate in the study and were included in it. A total of 143 participants, 84.6% of whom were assistant physicians.

Demographic Data

The study participants were predominantly male (59.4%). The average age was 30.9 ± 6.5 years, ranging from 24 to 32, and the average professional experience was 5.9 ± 6.3 years. Most of the participants (84.6%) were assistant physicians, 7.7% were specialist physicians, and 7.7% were faculty members. Regarding their specialization training, 44.8% of participants trained at city hospitals, 39.2% at training and research hospitals, and 16.1% at university hospitals (Table 1).

Table 1. Socio-demographic characteristics of the participants

	n	%
Age (years) (n=142)		
Mean±SD*	30.9±6.5	
Median (min-max)	29 (24-58)	
Gender (n=143)		
Female	58	40.6
Male	85	59.4
Academic title (n=143)		
Assistant physician	121	84.6
Specialist	11	7.7
Faculty member	11	7.7
The institution where specialization training was received (n=143)		
University Hospital	23	16.1
Training and Research Hospital	56	39.2
City Hospital	64	44.8
Professional experience (years) (n=142)		
Mean±SD*	5.9±6.3	
Median (min-max)	4 (1-35)	
SD: Standart deviation, Min-max: Minimum-maximum		

SD: Standard deviation, Min-max: Minimum-maximum

Answers of the Participants

Table 2 shows the questionnaire and the response rates given by the participants. Most participants (88%) stated they received training on interventional procedures in the ED. However, the rate of those who thought they had sufficient knowledge about the legal responsibilities, obligations, and legal regulations regarding interventional procedures was 18.2%. The rate of those who believed they had enough knowledge about the distinction between complications and malpractice was 40.1%. The rate of those who said that the concepts of complication and malpractice cause them to hesitate when performing interventional procedures on patients was 31.5%.

Table 2. Table of questionnaire-based questions and answers given by participants and their rates

	Answers	n	%
Have you received training on interventional procedures performed in the emergency department? (n=142)	Yes	125	88.0
	Workshop	6	4.2
	Symposium	18	12.6
Where did you receive in-service training regarding interventional procedures performed in the emergency department? (n=143)	Course	56	39.2
	Congress	38	26.6
	Education received at the institution where you work	120	83.9
Do you know enough about your legal responsibilities, obligations, and legal regulations regarding interventional procedures performed in the emergency department? (n=143)	Yes	26	18.2
Do you think compulsory liability insurance for malpractice (related to medical malpractice) protects the physician in a legal situation in interventional procedures performed in the emergency department? (n=142)	Yes	19	13.4
Do you think you know enough about the distinction between complications and malpractice? (n=142)	Yes	57	40.1
Do the concepts of complication malpractice cause you to act hesitantly when performing interventional procedures on the patient? (n=143)	Yes	45	31.5
Do you obtain informed consent before invasive procedures in the emergency department? (n=143)	I take before every intervention	24	16.8
	Sometimes	112	78.3
	Never	7	4.9
How do you obtain informed consent in the emergency department? (n=141)	Verbal	26	18.4
	Written	115	81.6
Do you believe that informed consent protects you from legal proceedings? (n=143)	Yes	38	26.6
Are there any procedures that can be performed in the emergency department without informed consent? (n=143)	Yes	130	90.9
Do you think that written informed consent forms inform patients sufficiently? (n=143)	Yes	32	22.4
Do you think it would be safer and more accessible if informed consent forms were read and signed electronically (SMS, etc.)? (n=140)	Yes	109	77.9
Do patients and their relatives who read informed consent forms avoid medical procedures? (n=143)	Yes	18	12.6
Who do you think is more reliable to keep the signed informed consent forms? (n=142)	Ministry of Health	56	39.4
	Institution you work for	60	42.3
	The physician him/herself	14	9.9
	Electronic environment	45	31.5
How do you think it is more reliable to keep signed informed consent forms? (n=143)	Printed file	3	2.1
	Both of them	92	64.3
Do you know what interventional procedures you are qualified to perform? (n=143)	Yes	60	42.0
Did you receive training on interventional procedures during your postgraduate emergency medicine training? (n=142)	Yes	44	31.0
Do you find the training you received on interventional procedures during your postgraduate emergency medicine education sufficient? (n=141)	Yes	73	51.8
Have you read any additional resources other than the training program regarding your legal responsibilities for interventional procedures performed in the emergency department? (n=143)	Yes	36	25.2
Which conditions were you aware of for a medical intervention you performed in the emergency room to be considered legal? (n=143)	Informing the patient and obtaining consent	123	86.0
Which articles are you aware of regarding the conditions under which patient consent for invasive procedures to be performed in the emergency department must be obtained in order to legally protect you? (n=143)	Informing about all the conditions and possible consequences of the treatment	126	88.1
Does the physician have an obligation to apply all new methods in interventional procedures to be performed in the emergency department? (n=142)	Yes	33	23.1

Knowledge of Legal Responsibilities

Many participants indicated that they did not know their legal responsibilities regarding ED procedures (n=117). This knowledge varied significantly between groups according to academic title, educational institution, and professional

experience ($p<0.001$) (Table 3). When asked from whom they preferred to learn about their legal responsibilities, there was a significant difference between the answers according to the academic title, with more assistant physicians (n=91) preferring physicians with legal training ($p=0.047$).

Table 3. Comparison of participant information regarding interventional procedures performed in the emergency department, including academic title, institution where specialist training was received, and professional experience distribution

Questionnaire-based questions	Academic title			p	Institution where specialized training was received			p	Professional experience	
	Assistant physician	Specialist	Faculty member		University Hospital	Training and Research Hospital	City Hospital		Median, years	p
	n (%)	n (%)	n (%)		n (%)	n (%)	n (%)			
Have you received training on interventional procedures performed in the emergency department? ^a	103 (82.4)	11 (8.8)	11 (8.8)	0.165	23 (18.4)	51 (40.8)	51 (40.8)	0.037	4	0.012
Do you know enough about your legal responsibilities, obligations, and regulations regarding interventional procedures performed in the emergency department? ^a	9 (34.6)	9 (34.6)	8 (30.8)	<0.001	11 (42.3)	11 (42.3)	4 (15.4)	<0.001	2	<0.001
Do you think it would be more helpful to learn from whom about your legal responsibilities, obligations, and legal regulations during interventional procedures performed in the emergency department? ^b	91 (82.7)	8 (7.3)	11 (10.0)	0.047	17 (15.5)	43 (39.1)	50 (45.5)	0.996	4	0.275

^a: The "yes" answers in the center were placed in the table, ^b: The most common answer from the participants, "A medical doctor with legal education", was included in the table

Malpractice and Complications

When comparing their views on complications and malpractice, many participants with more years of experience felt they had sufficient knowledge to distinguish between complications and malpractice ($p=0.034$). Participants with more professional experience also reported more significant hesitation to perform procedures due to concerns about complications and malpractice ($p=0.009$, $p=0.030$) (Table 4).

Participants' Answers to Questions on Knowledge Level about Interventional Procedures in the Postgraduate Emergency Medicine Education Program

Experts and faculty members were significantly more likely to be aware of the interventional procedures they were authorized to perform under the emergency medicine training program ($p<0.001$). Similarly, those with more years of experience (median 5 years) were more likely to answer "yes" ($p<0.001$). When asked if they had received training about interventional procedures in the PEM training program at their institution, specialists and faculty members again answered "yes" ($n=6$, $n=7$) significantly more often ($p=0.028$), and the likelihood increased with experience ($p=0.001$) (Table 5).

Additional Legal Resources and Professional Experience

In addition to training in interventional procedures in PEM, residents were less likely to have access to legal resources ($n=99$) ($p<0.001$). As participants gained more professional

experience, the need for additional resources increased ($p<0.001$). As experience increased, participants were more aware of the legal criteria for performing medical interventions in the ED; they felt they had the appropriate competence to perform the intervention ($p=0.027$). Furthermore, experienced physicians were more likely to agree that they were responsible for implementing all new methods of interventional procedures in the ED ($p=0.005$) (Table 6).

DISCUSSION

Medical malpractice has been extensively studied worldwide, particularly in developed countries, for nearly half a century. This multifaceted issue, encompassing ethical, legal, medical, educational, and managerial dimensions, has gained traction in Turkey in recent years, sparking discussions and a search for solutions.⁹

Key findings revealed that participants from university hospitals and those with more experience were more likely to report receiving procedural training. Specialists and faculty members with extensive experience believe that professional liability insurance offers legal protection during interventional procedures. Assistant physicians were less confident in distinguishing between complications and malpractice. While the level of knowledge regarding legal responsibilities in interventional procedures does not show a significant difference between the institutions where physicians received

Table 4. Comparison of participants' views on the concepts of complication and malpractice in interventional procedures performed in the emergency department in terms of academic title, institution where specialization training is received, and professional experience distribution

Questionnaire-based questions	Academic title			Institution where specialized training was received					Professional experience	
	Assistant physician	Specialist	Faculty member		University Hospital	Training and Research Hospital	City Hospital	p		
	n (%)	n (%)	n (%)	p	n (%)	n (%)	n (%)		Median, years	p
Do you think compulsory liability insurance for malpractice (related to medical malpractice) protects the physician in a legal situation in interventional procedures performed in the emergency department? ^a	8 (42.1)	5 (26.1)	6 (31.6)	<0.001	8 (42.1)	9 (47.4)	2 (10.5)	<0.001	9.0	<0.001
Do you think you know enough about the distinction between complications and malpractice? ^a	42 (73.7)	9 (15.8)	6 (10.5)	0.034	11 (19.3)	23 (40.4)	23 (40.4)	0.816	4.0	0.219
Regarding the distinction between complication and malpractice, do the concepts of complication and malpractice cause you to hesitantly when performing interventional procedures on the patient? Do you think you have enough knowledge? ^a	39 (86.7)	2 (4.4)	4 (8.9)	0.009	8 (17.8)	16 (35.6)	21 (46.7)	0.068	3.0	0.030

^a: The "yes" answers in the center were placed in the table

Table 5. Comparison of the participant's knowledge about the post-graduate emergency medicine interventional procedure education program in terms of academic title, institution where specialization training was received, and distribution of professional experience

Questionnaire-based questions	Academic title			Institution where specialized training was received					Professional experience	
	Assistant physician	Specialist	Faculty member		University Hospital	Training and Research Hospital	City Hospital			
	n (%)	n (%)	n (%)	p	n (%)	n (%)	n (%)	p	Median, years	p
Do you know what interventional procedures you are qualified to perform? ^a	43 (71.7)	9 (15.0)	8 (13.3)	<0.001	12 (20)	28 (46.7)	20 (33.3)	0.064	5.0	<0.001
Did you receive training on interventional procedures during your postgraduate emergency medicine training?	31 (70.5)	6 (13.6)	7 (15.9)	0.028	9 (20.5)	17 (38.6)	18 (40.9)	0.756	5.0	0.001
Do you find the training you received on interventional procedures during your postgraduate emergency medicine education sufficient? ^a	60 (82.2)	7 (9.6)	6 (8.2)	0.690	12 (16.4)	27 (37.0)	34 (46.6)	0.869	4.0	0.082

^a: The "yes" answers in the center were placed in the table

Table 6. Comparison of the participants' awareness of their legal responsibilities regarding interventional procedures performed in the emergency department in terms of academic title, institution where specialized training was received, and professional experience distribution

Questionnaire-based questions		Academic title			p	Institution where specialized training was received			p	Professional experience	
		Assistant physician	Specialist	Faculty member		University Hospital	Training and Research Hospital	City Hospital		Median, years	p
		n (%)	n (%)	n (%)		n (%)	n (%)	n (%)			
Have you read any additional resources besides the training program regarding your legal responsibilities for interventional procedures performed in the emergency department? ^a		22 (61.1)	6 (16.7)	8 (22.2)	<0.001	11 (30.6)	13 (43.0)	12 (33.3)	0.020	7	<0.001
Which conditions were you aware of for a medical intervention you performed in the emergency room to be considered lawful? Informing the patient and obtaining consent	Informing the patient and obtaining consent	103 (83.7)	19 (8.1)	10 (8.1)	0.712	21 (17.1)	50 (40.7)	52 (42.3)	0.326	4.0	0.133
	Having the authority to provide medical intervention	90 (83.3)	8 (7.4)	10 (9.3)	0.529	21 (17.1)	42 (38.9)	45 (41.7)	0.132	4.0	0.027
	The intervention must be aimed at legally prescribed purposes	52 (80.0)	7 (10.8)	6 (9.2)	0.354	12 (18.5)	28 (43.1)	25 (38.5)	0.379	5.0	0.007
	The intervention must comply with the rules of medical science	94 (83.9)	7 (6.3)	11 (9.8)	0.111	19 (17.0)	43 (38.4)	50 (44.6)	0.849	4.0	0.160
Is the physician obligated to apply all new methods in interventional procedures in the emergency department? ^a		24 (72.7)	4 (12.1)	5 (15.2)	0.080	6 (18.2)	14 (42.4)	13 (39.4)	0.739	5.0	0.005

a: The "yes" answers in the center were placed in the table

their specialist training, it was revealed that experts with more experience have significantly higher levels of knowledge in this field. As experience grew, participants were more likely to consult additional resources on legal responsibilities and felt that new developments in emergency medicine should be adopted.

Our findings show that physicians specializing in university hospitals have higher education and awareness about interventional procedures than those trained in training, research, and city hospitals. This situation is supported by Bilge et al.¹⁰ who compared the level of education regarding interventional procedures between university and research hospitals and found higher education rates in university settings. It is compatible with similar studies, Arvier et al.¹¹ He emphasized the need for more training in emergency room procedures in line with our results. In addition, City Hospitals have the highest number of patient admissions and a relatively higher clinical workload. The hospital's high patient load and expanded treatment services may hinder educational opportunities. According to the results of our study, while planning the academic activities of Assistant Physicians studying in City Hospitals, the aim should be to increase their knowledge level about legal liabilities in interventional procedures.

In our study, assistant physicians thought that they did not know the difference between malpractice and complications. This is consistent with previous studies showing persistent uncertainty among physicians regarding these concepts.¹¹ Most physicians in our study admitted hesitancy in performing interventional procedures due to concerns about complications leading to malpractice. Similarly, Başer et al.¹² reported that 71.6% of

family physicians avoid procedures with high complication rates. Additionally, Hiyama et al.¹³ They found that physicians with more than nine years of experience tended to avoid risky procedures, indicating a relationship between experience and procedure avoidance. In our study, the mean duration of professional experience was 5.9 years, and there was no significant difference between it and the avoidance of invasive procedures. A study evaluated physicians' legal knowledge about informed consent and confidentiality, and the lowest level of knowledge was found in emergency physicians.¹⁴ Future studies involving more comprehensive physician groups are needed to determine whether this situation is due to the difference in working conditions between gastroenterologists and emergency physicians or the duration of professional experience.

According to a study by Skiba et al.¹⁵ in which Australian assistant doctors participated, doctors must be more aware of their legal responsibilities regarding informed consent. In another study, it is understood from the answers given by assistant doctors to education questions that assistant doctors need to receive adequate training regarding their legal responsibilities and that their level of knowledge needs to be higher. Medical education in all branches throughout Türkiye is carried out according to a specific curriculum. Based on our results, planning to teach physicians legal responsibilities in the emergency medicine basic training program in the earlier years would be more beneficial. In addition, the increase in faculty members' legal education can increase awareness about the legal responsibilities of physicians. As a matter of fact, in the literature, medical education processes are dynamically evaluated and rearranged according to changing conditions.^{16,17}

Moreover, our study revealed that only one-quarter of participants sought additional resources beyond the prescribed training program to educate themselves on their legal responsibilities concerning interventional procedures in the ED. This discrepancy is further supported by a statistically significant difference in age distribution between participants who sought additional resources and those who did not, indicating a tendency for assistant physicians to neglect supplementary learning materials. Odabaşı et al.'s¹⁸ study revealed that 72.5% of physicians lacked awareness of the articles within the TCK related to their criminal responsibilities, with 80.9% indicating a lack of training in this area. These findings parallel our own, indicating a shared concern: physicians do not understand their legal obligations.

Given these legal intricacies, it emphasizes the importance of physicians seeking supplementary resources beyond standard training programs to acquaint themselves with their legal duties. Incorporating such knowledge into their medical practices is essential for navigating the complex legal landscape and upholding the highest standards of care and accountability. In addition, while providing basic emergency medicine training to assistant physicians, their legal responsibilities and the need to obtain consent before procedures should be explained at the beginning of their training. In this way, the doctor and the patient will be protected from bad experiences that may occur in the future.

Limitations

Our study cannot be generalized because it was conducted in Turkey and was a single center. In addition, there were fewer faculty members and specialists in the physician groups than in the assistant physicians, which may reduce the robustness of certain statistical analyses. Future studies should consider this difference and aim for more comprehensive assessments that include a larger pool of physicians across multiple centers. It is also important to recognize that participants' knowledge and perceptions of legal responsibilities may not fully reflect actual conditions. Factors such as individual experiences and educational backgrounds may influence responses and make it difficult to obtain an objective assessment.

CONCLUSION

This study highlights the essential role of legal knowledge and preparation among emergency physicians who perform interventional procedures. Our findings reveal significant differences in legal awareness across experience levels, academic titles, and educational institutions. Faculty members with more experience had significantly greater knowledge of their legal responsibilities, highlighting the need for structured legal education in emergency medicine education. Associate physicians, who comprised the majority of participants, demonstrated less confidence in distinguishing between malpractice and complications. Malpractice concerns also appear to deter some physicians from performing high-risk procedures, potentially impacting patient care. The findings highlight the importance of integrating comprehensive legal education early into graduate emergency medicine education to prepare physicians better to address the legal aspects of their practice. This education should explain complications and malpractice, informed consent, and liability protections. We recommend further research with larger, more diverse

physician groups across multiple sites to develop strategies for legal education in emergency medicine.

ETHICAL DECLARATIONS

Ethics Committee Approval

Ethical approval was obtained from the Ankara Bilkent City Hospital No. 1 Clinical Researches Ethics Committee (Date: 12/09/2023, Decision No: E1-23-4013).

Informed Consent

All participants signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

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Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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